

1 / 45

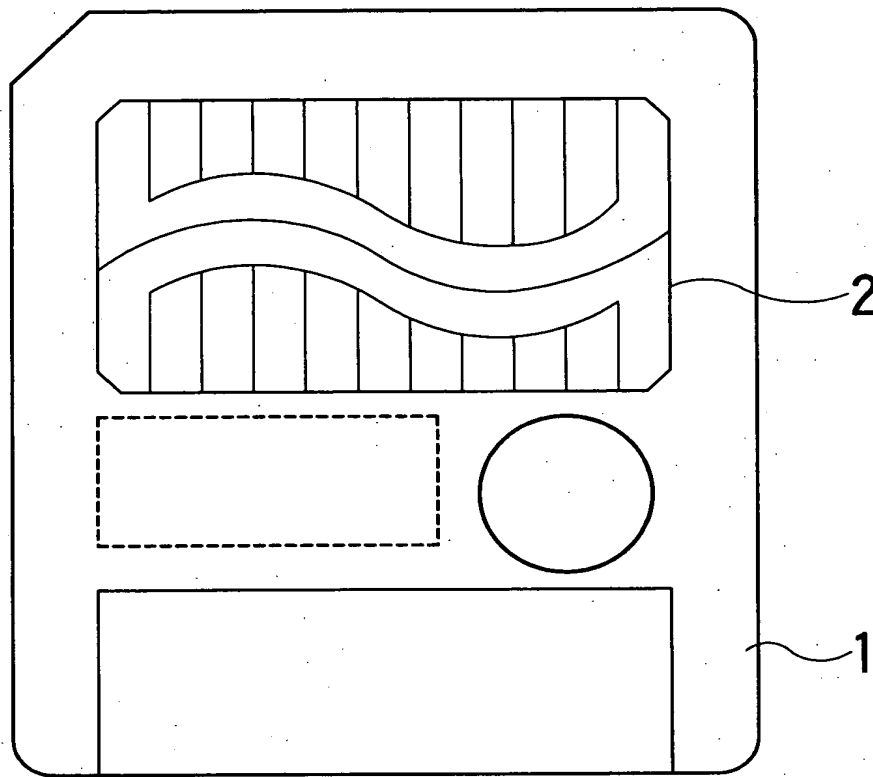


FIG. 1

PRIOR ART

2/45

		0	255	256	263
PHYSICAL BLOCK 0	Page 0	DATA AREA (256BYTES)		REDUNDANT DIVISION (16BYTES)	
	Page 1				
	⋮				
	Page 15				
PHYSICAL BLOCK 1	Page 0				
	Page 1				
	⋮				
	Page 15				
⋮	⋮	⋮		⋮	
PHYSICAL BLOCK 511	Page 0				
	Page 1				
	⋮				
	Page 15			21/45	

FIG. 2

PRIOR ART

3/45

PHYSICAL BLOCK 0	SECTOR 0	512 BYTES
	SECTOR 1	
	⋮	
	SECTOR 7	
PHYSICAL BLOCK 1	SECTOR 8	
	SECTOR 9	
	⋮	
	SECTOR 15	
⋮	⋮	⋮
PHYSICAL BLOCK 499	SECTOR 3992	
	SECTOR 3993	
	⋮	
	SECTOR 3999	

FIG. 3

PRIOR ART

4/45

DATA DIVISION

BYTE	PAGE 0(EVEN PAGE)	PAGE 1(ODD PAGE)
0~255	DATA Area-1	DATA Area-2

REDUNDANT DIVISION

BYTE	EVEN PAGE	ODD PAGE
256	User Data Area	ECC Area-2
257		
258		
259		
260	Data Status Area	Block Address Area-2
261	Block Status Area	
262	Block Address Area-1	ECC Area-1
263		

FIG. 4

PRIOR ART

5/45

		0	511	512	527
PHYSICAL BLOCK 0	Page 0	DATA AREA		REDUNDANT DIVISION (16BYTES)	
	Page 1				
	⋮				
	Page 15				
PHYSICAL BLOCK 1	Page 0				
	Page 1				
	⋮				
	Page 15				
⋮	⋮	⋮	⋮	⋮	⋮
PHYSICAL BLOCK 1023	Page 0				
	Page 1				
	⋮				
	Page 15				

FIG. 5

PRIOR ART

6/45

LOGICAL BLOCK 0	SECTOR 0	512 BYTES
	SECTOR 1	
	⋮	
	SECTOR 15	
LOGICAL BLOCK 1	SECTOR 16	
	SECTOR 17	
	⋮	
	SECTOR 31	
⋮	⋮	⋮
LOGICAL BLOCK 999	SECTOR 15984	
	SECTOR 15985	
	⋮	
	SECTOR 15999	

FIG. 6

PRIOR ART

7/45

DATA DIVISION

BYTE	
0~511	DATA Area

REDUNDANT DIVISION

BYTE	
512	User Data Area
513	
514	
515	
516	Data Status Area
517	Block Status Area
518	Block Address Area-1
519	
520	ECC Area-2
521	
522	
523	Block Address Area-2
524	
525	ECC Area-1
526	
527	

FIG. 7

PRIOR ART

8/45

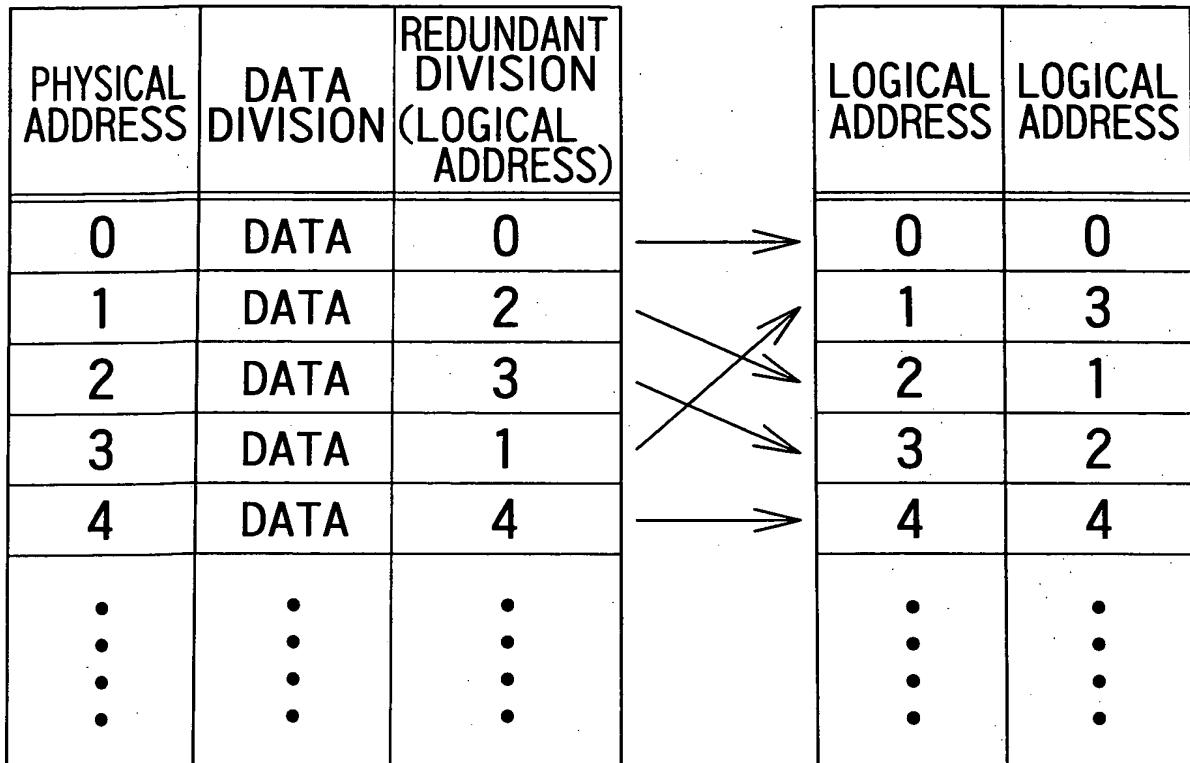


FIG. 8
PRIOR ART

9/45

OFFSET (LOGICAL BLOCK ADDRESS)	PHYSICAL BLOCK ADDRESS	PHYSICAL BLOCK ADDRESS (BINARY DATA)			
		UPPER BYTE		LOWER BYTE	
word0(LBA=0)	0	0000	0000	0000	0000
word1(LBA=1)	500	0000	0001	1111	0100
word2(LBA=2)	327	0000	0001	0100	0111
⋮	⋮	⋮	⋮	⋮	⋮
word497(LBA=497)	244	0000	0000	1111	0100
word498(LBA=498)	249	0000	0001	1110	1111
word499(LBA=499)	128	0000	0001	1000	0000

FIG. 9

PRIOR ART

OFFSET (LOGICAL BLOCK ADDRESS)	PHYSICAL BLOCK ADDRESS	PHYSICAL BLOCK ADDRESS (BINARY DATA)			
		UPPER BYTE		LOWER BYTE	
word0(LBA=0)	0	0000	0000	0000	0000
word1(LBA=1)	1000	0000	0011	1110	1000
word2(LBA=2)	654	0000	0010	1000	1110
⋮	⋮	⋮	⋮	⋮	⋮
word997(LBA=997)	488	0000	0001	1110	1000
word998(LBA=998)	498	0000	0001	1111	0010
word999(LBA=999)	256	0000	0001	0000	0000

FIG. 10

PRIOR ART

10/45

D7	D6	D5	D4	D3	D2	D1	D0	256 + 8 BYTE/PAGE
0	0	0	1	BA10	BA9	BA8	BA7	262 BYTE(EVEN PAGE)
BA6	BA5	BA4	BA3	BA2	BA1	BA0	P	259 BYTE(ODD PAGE)
								263 BYTE(EVEN PAGE)
								260 BYTE(ODD PAGE)

BA10~BA0: LOGICAL BLOCK ADDRESS
 P EVEN PARITY BIT "1" FIXED VALUE

FIG. 11

PRIOR ART

11/45

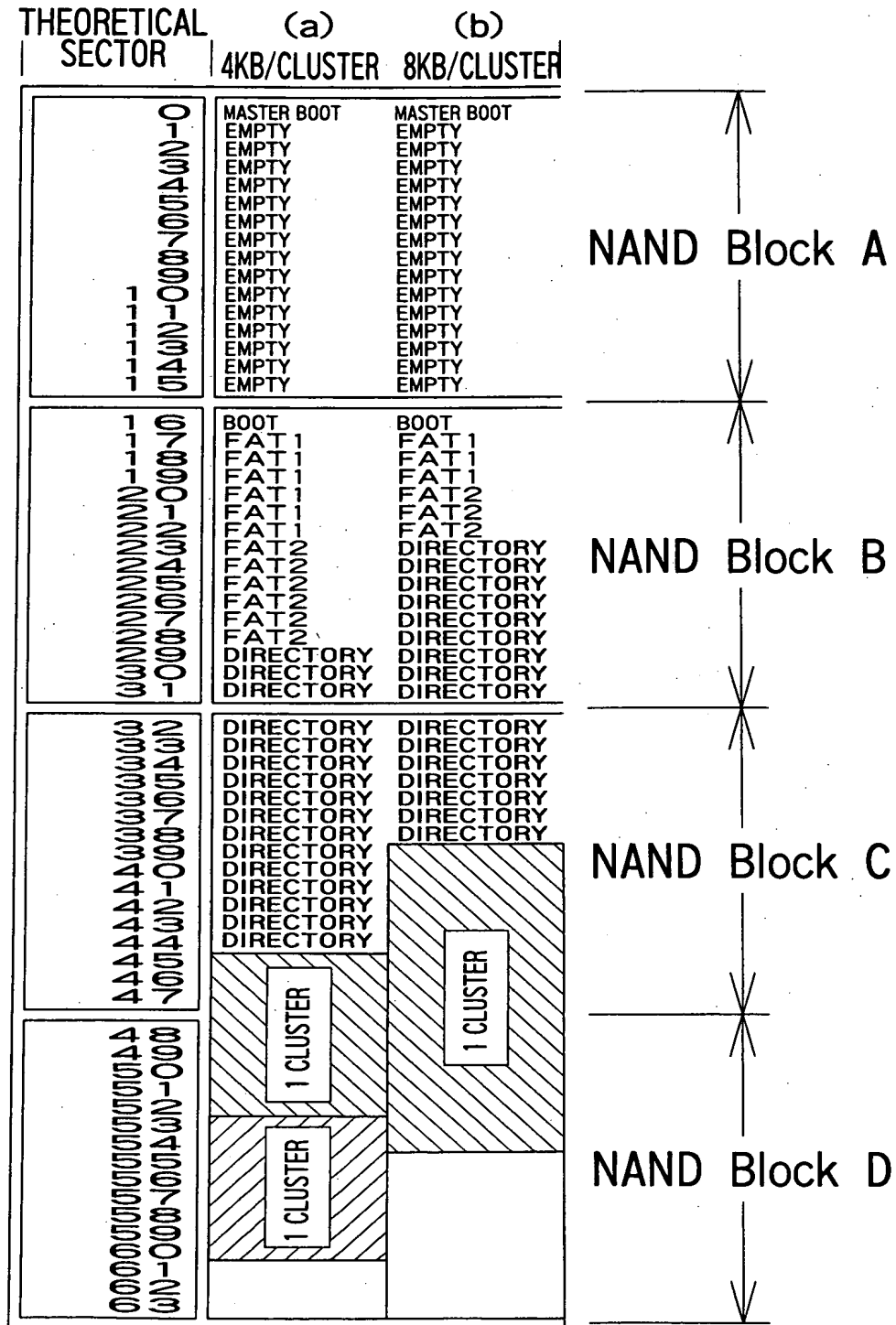


FIG. 12
PRIOR ART

12/45

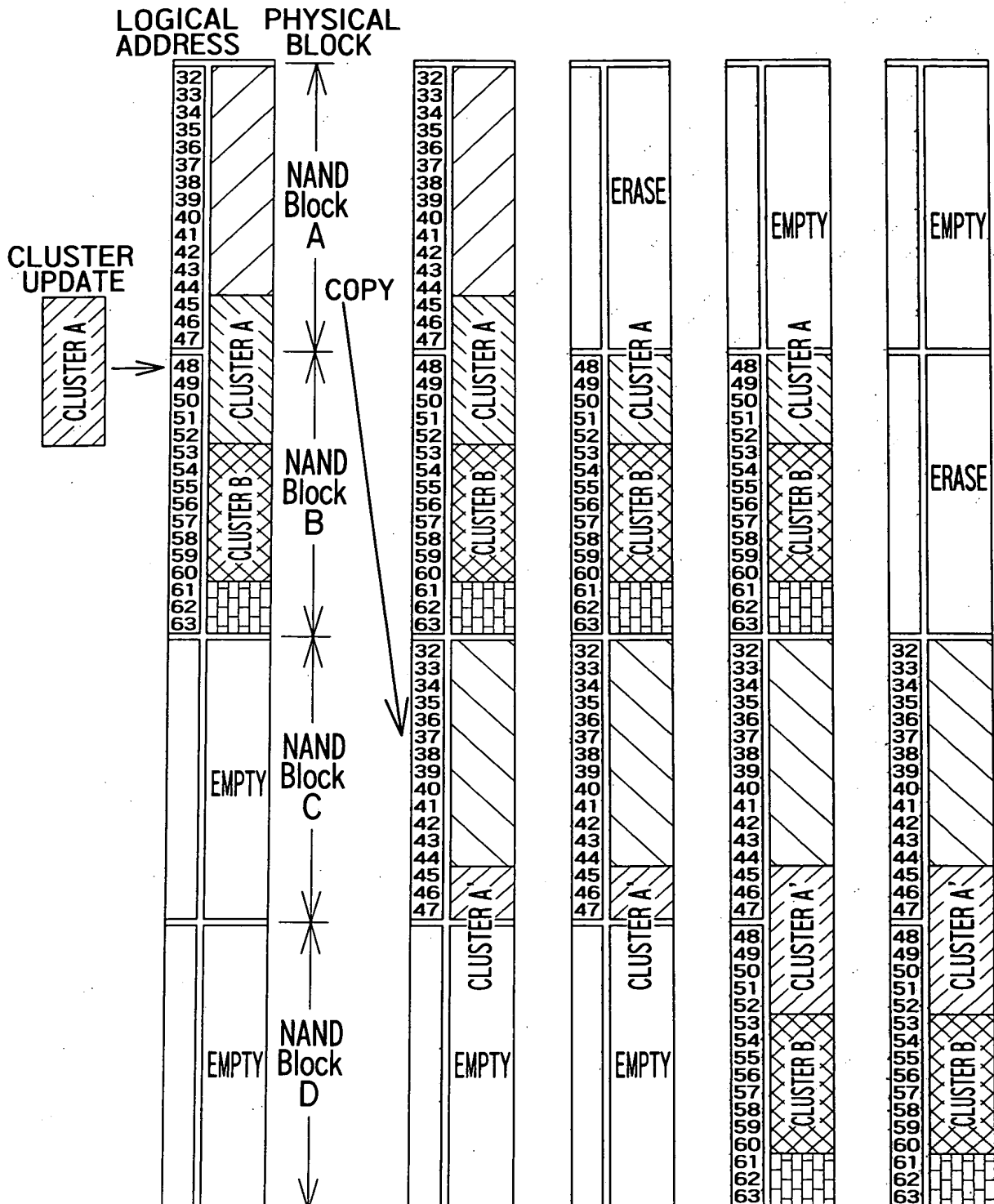


FIG. 13

PRIOR ART

13/45

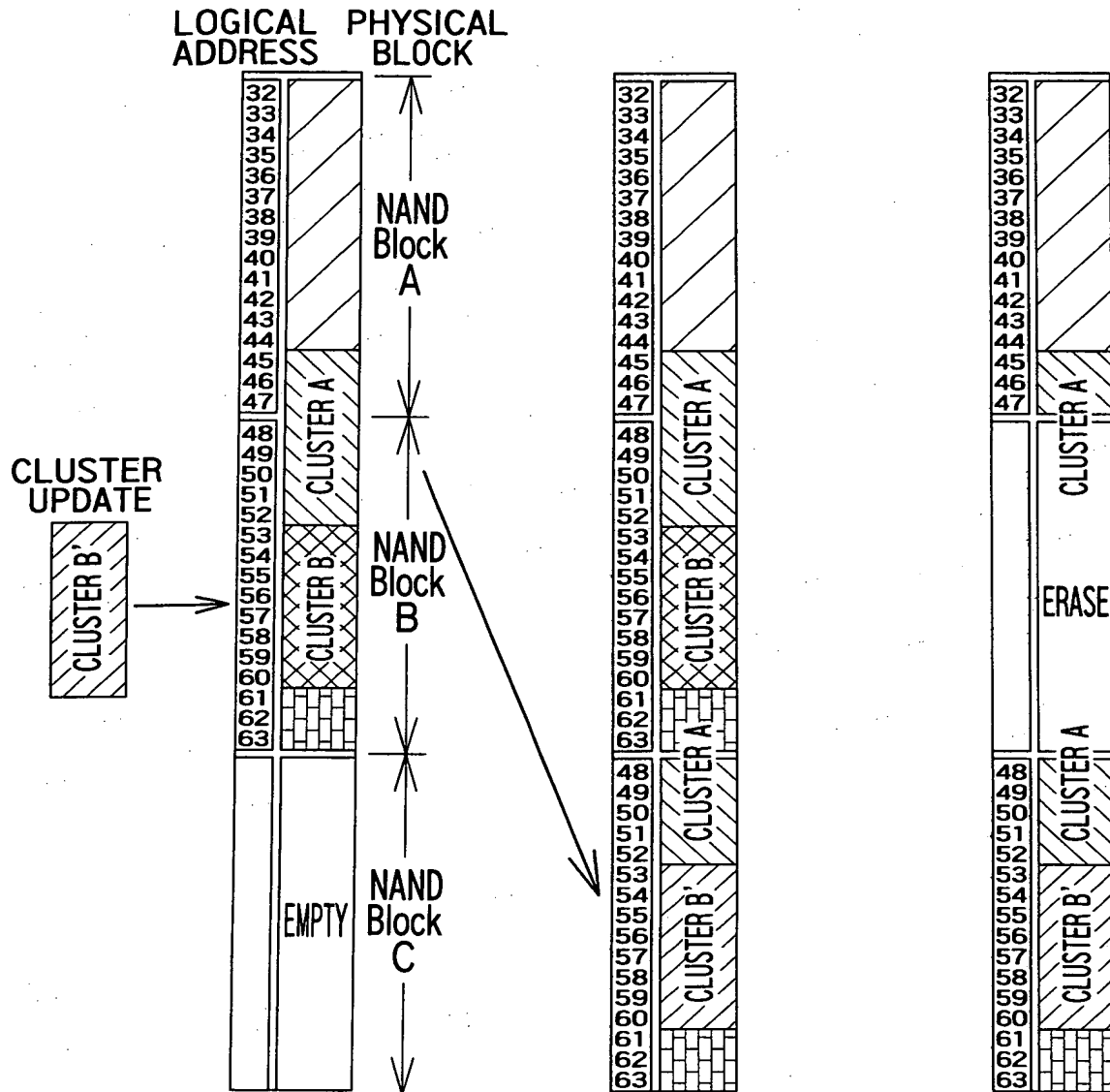


FIG. 14

PRIOR ART

14/45

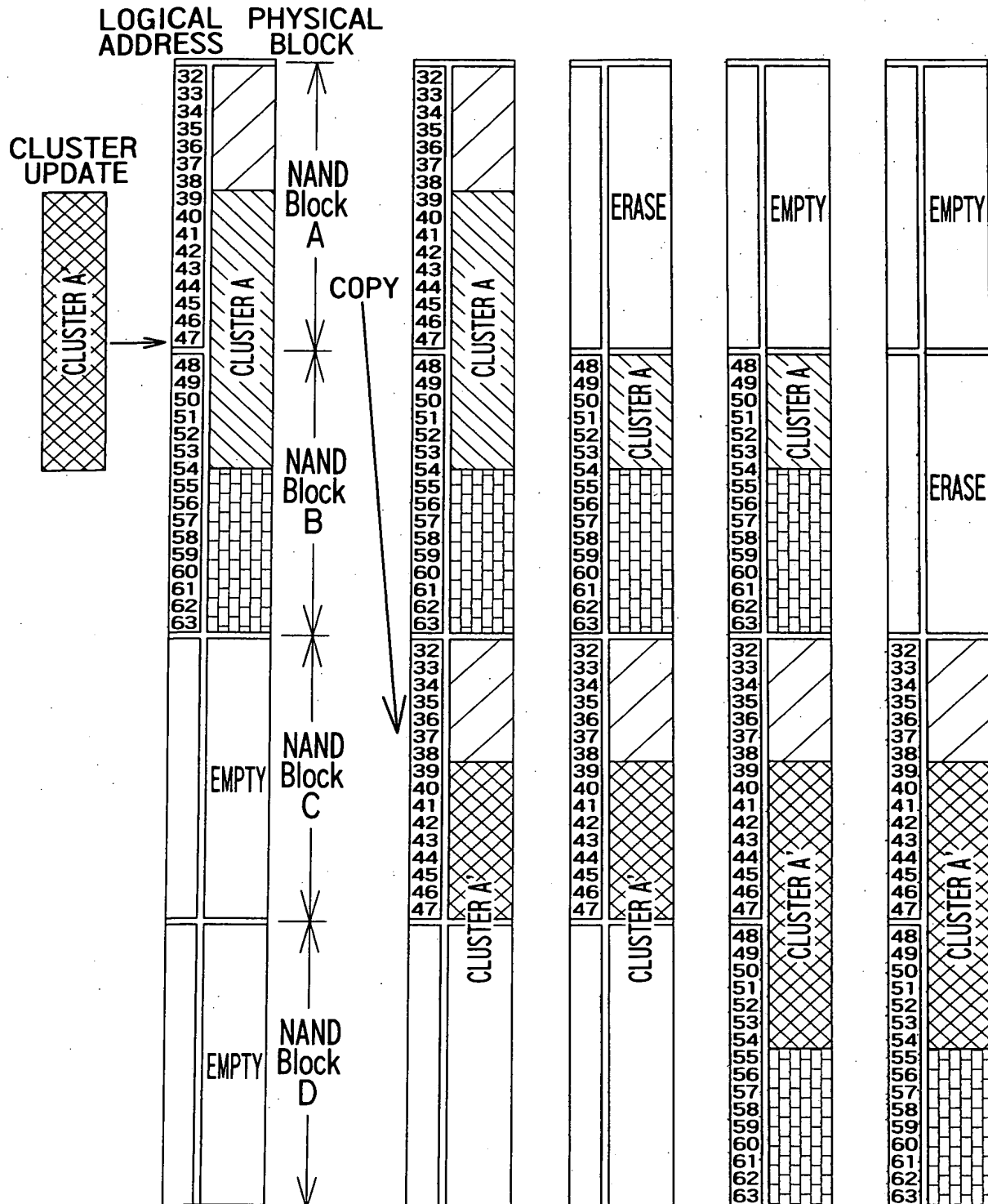


FIG. 15
 PRIOR ART

15/45

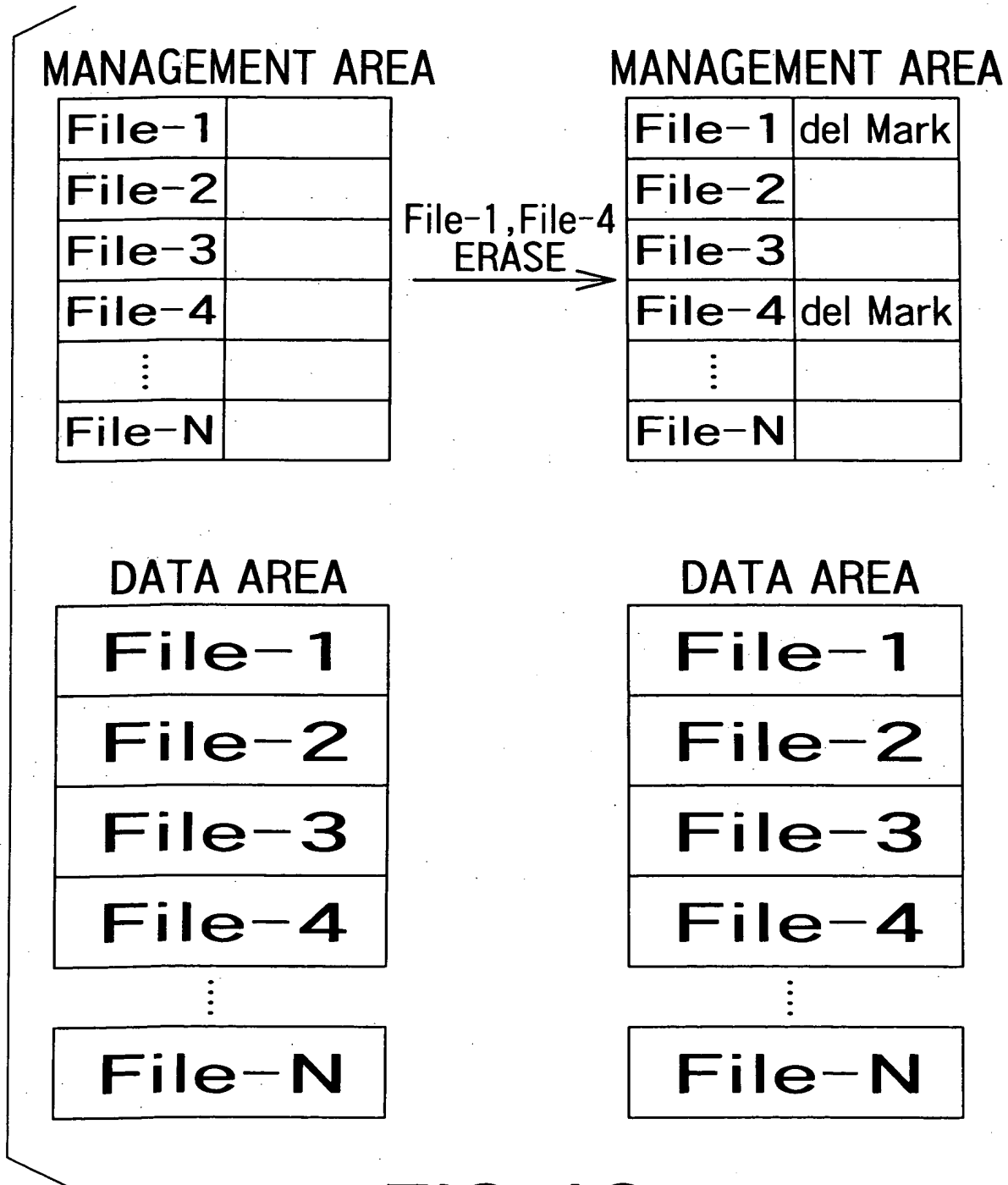


FIG. 16
 PRIOR ART

16/45

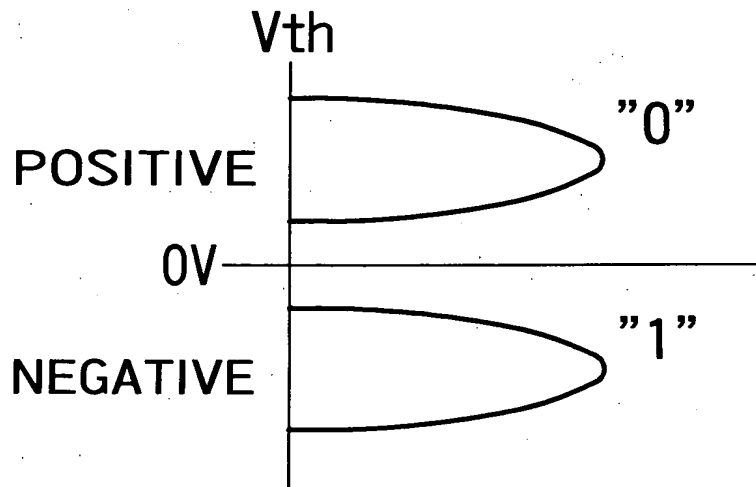


FIG. 17
PRIOR ART

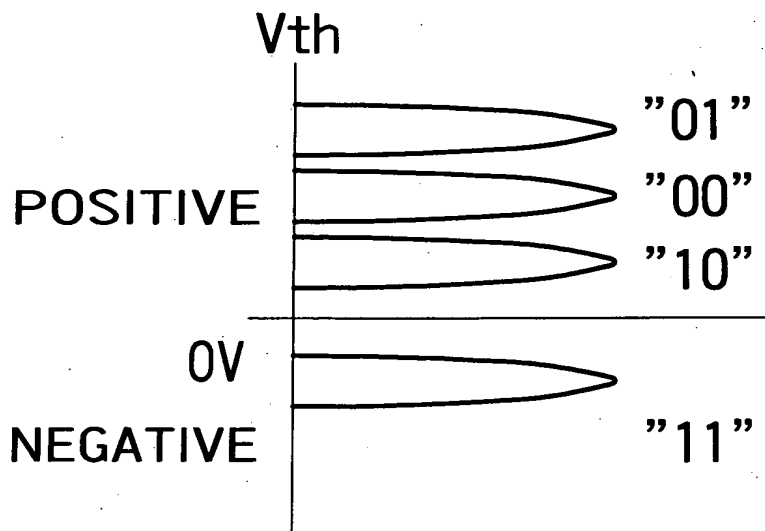


FIG. 18
PRIOR ART

17/45

CARD IN FIG.2(a)	CARD IN FIG.2(b)
<div> <div> <div>CPU</div> <div>ECC CIRCUIT 1</div> </div> <div>SYSTEM A</div> </div>	VNAVAILABLE
VNAVAILABLE	AVAILABLE
<div> <div> <div>CPU</div> <div>ECC CIRCUIT 2</div> </div> <div>SYSTEM B</div> </div>	

FIG.19
 PRIOR ART

18/45

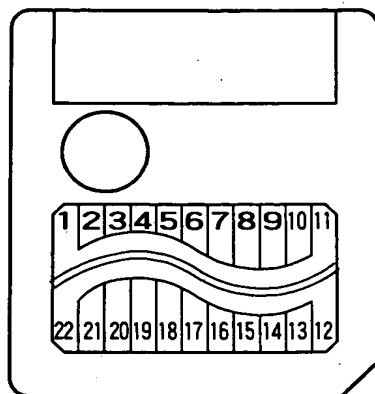


FIG. 20

1,10,11	V _{SS}	POWER SUPPLY (GND)
2	CLE	COMMAND LATCH ENABLE
3	ALE	ADDRESS LATCH ENABLE
4	\overline{WE}	WRITE ENABLE
5	\overline{WP}	WRITE PROTECT
6-9	I/O ₁₋₄	ADDRESS DATA COMMAND INPUT-OUTPUT PORT
13-16	I/O ₅₋₈	ADDRESS DATA COMMAND INPUT-OUTPUT PORT
17	NC	N_C
18	GND	GND LEVEL INPUT
19	R/ \overline{B}	READY BUSY OUTPUT
20	\overline{RE}	READ ENABLE
21	\overline{CE}	CHIP ENABLE
22,23	V _{CC}	POWER SUPPLY

FIG. 21

19/45

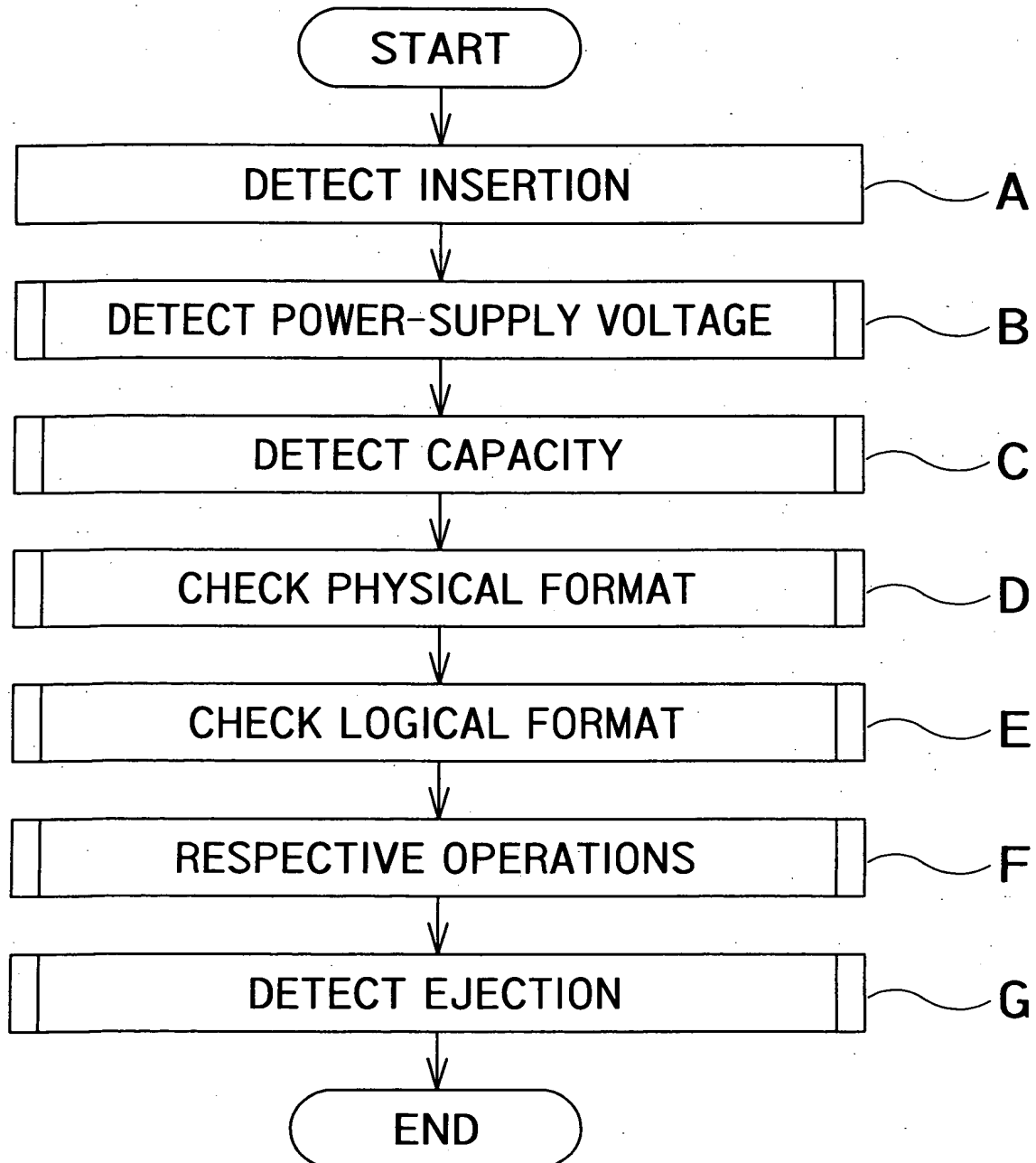
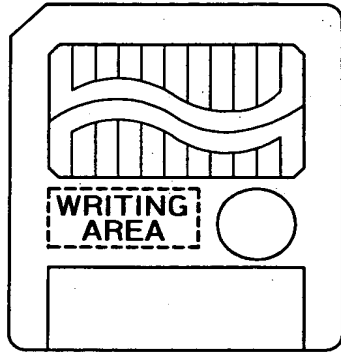


FIG. 22

20/45



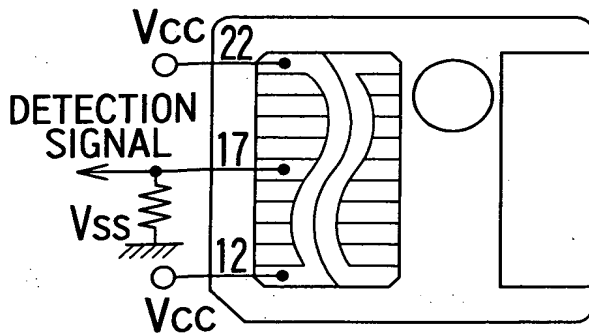
5V PRODUCT

FIG. 23(a)



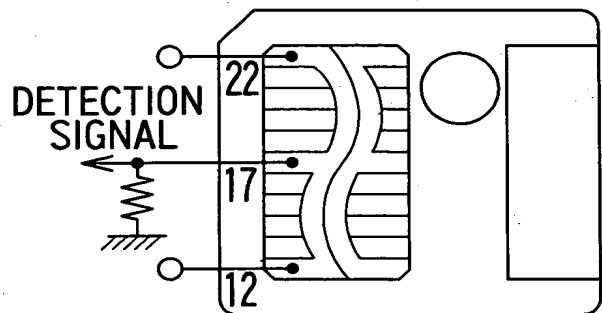
3.3V PRODUCT

FIG. 23(b)



5V PRODUCT

FIG. 24(a)



3.3V PRODUCT

FIG. 24(b)

21/45

5V DEDICATED CONNECTOR

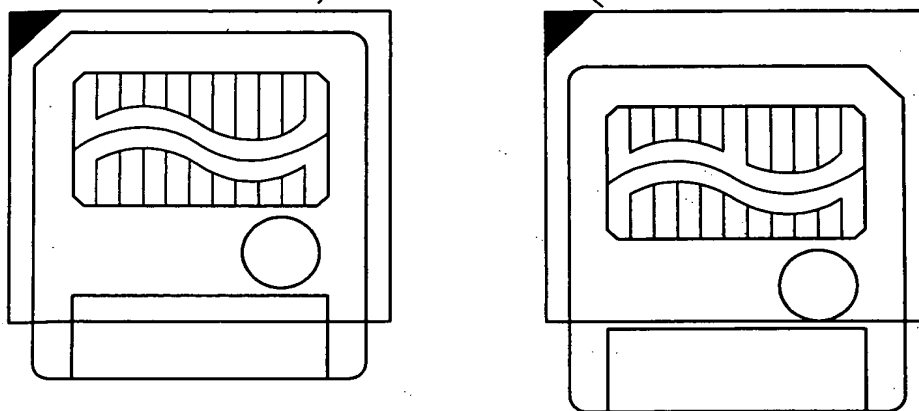


FIG. 25

3.3V DEDICATED CONNECTOR

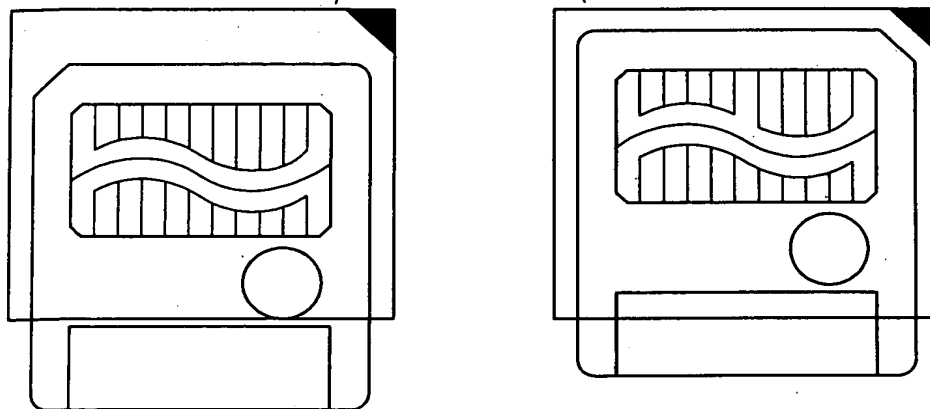


FIG. 26

22/45

5V/3.3V DEDICATED CONNECTOR

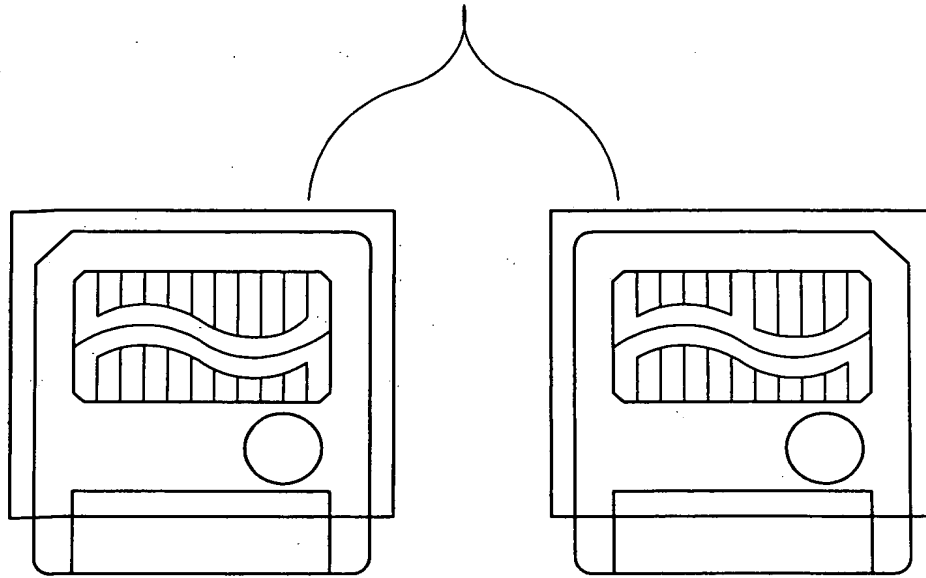


FIG. 27

23/45

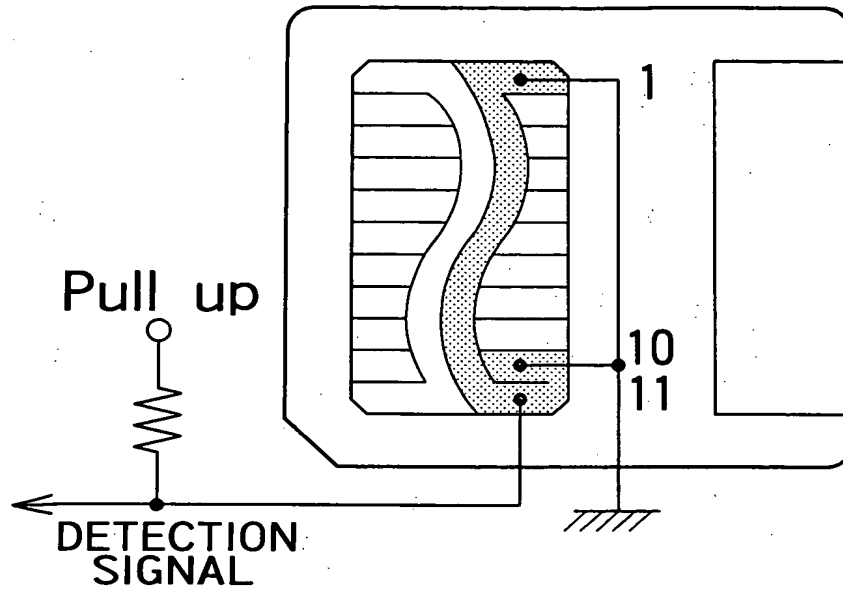


FIG. 28

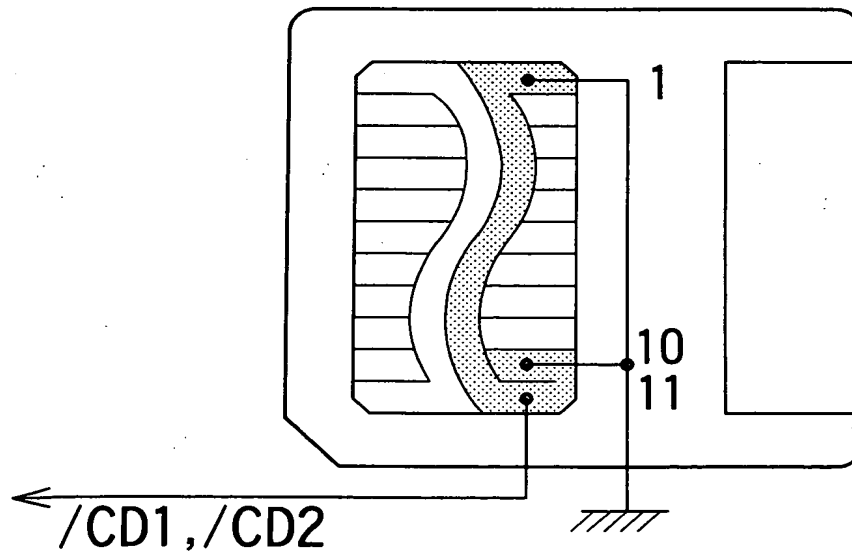


FIG. 29

24/45

	bit7	bit6	bit1	bit0
1stByte	00000000 111	00000000 110		00000000 001 00000000 000
2ndByte	00000000 111	00000001 110		00000001 001 00000001 000
	:	:	:	:
255thByte	11111110 111	11111110 110		11111110 001 11111110 000
266thByte	11111111 111	11111111 110		11111111 001 11111111 000

FIG. 30

LP00=D(*****0、***)、LP01=D(*****1、***)
LP02=D(*****0*、***)、LP03=D(*****1*、***)
LP04=D(*****0**、***)、LP05=D(*****1**、***)
LP06=D(****0***、***)、LP07=D(****1***、***)
LP08=D(**0****、***)、LP09=D(**1****、***)
LP010=D(**0*****、***)、LP011=D(**1*****、***)
LP012=D(*0*****、***)、LP013=D(*1*****、***)
LP014=D(0*****、***)、LP015=D(1*****、***)
LP00=D(*****、**0)、LP01=D(*****、**1)
LP02=D(*****、*0*)、LP03=D(*****、*1*)
LP04=D(*****、0**)、LP05=D(*****、1**)

FIG. 31

25/45

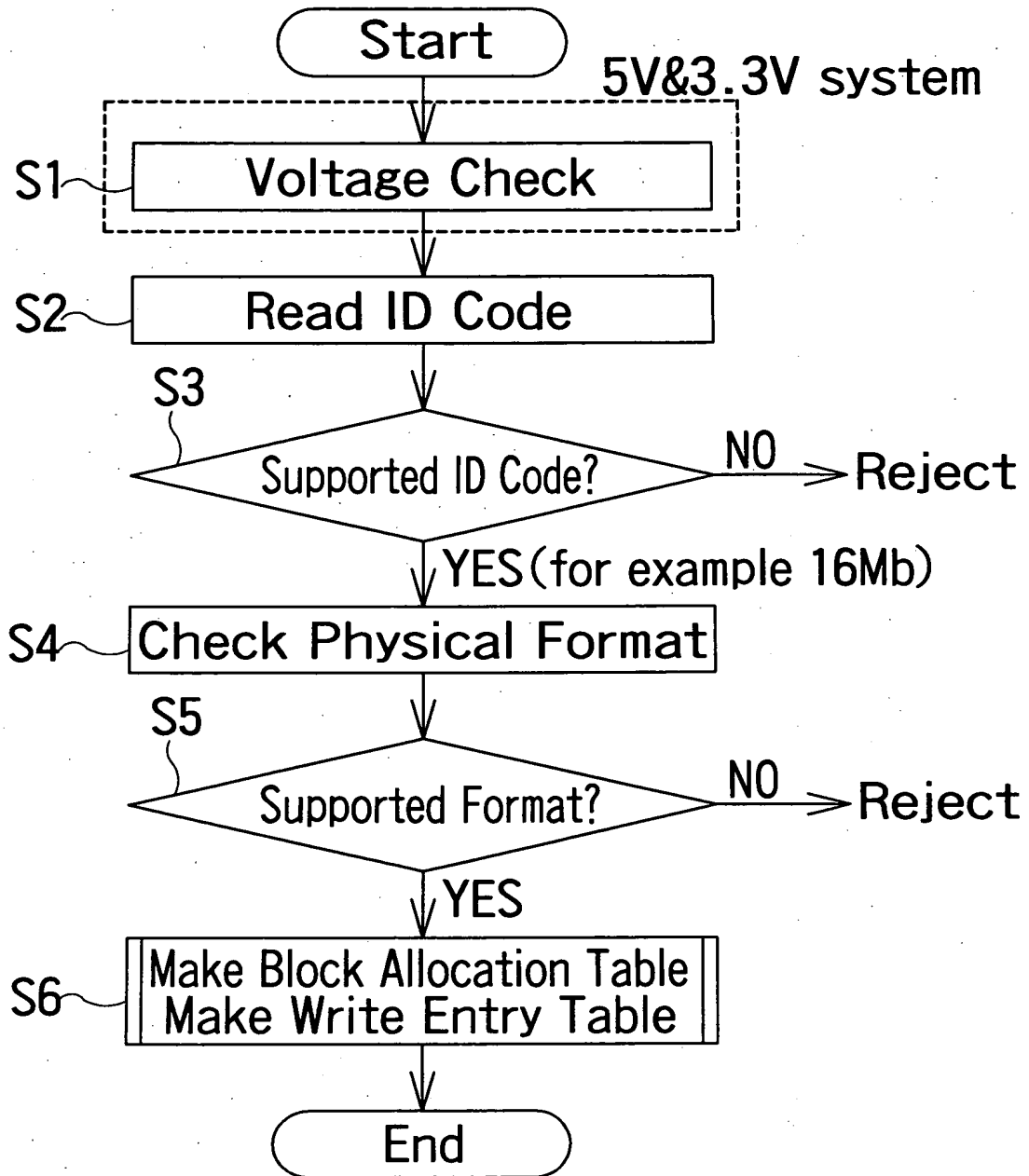


FIG. 32

26/45

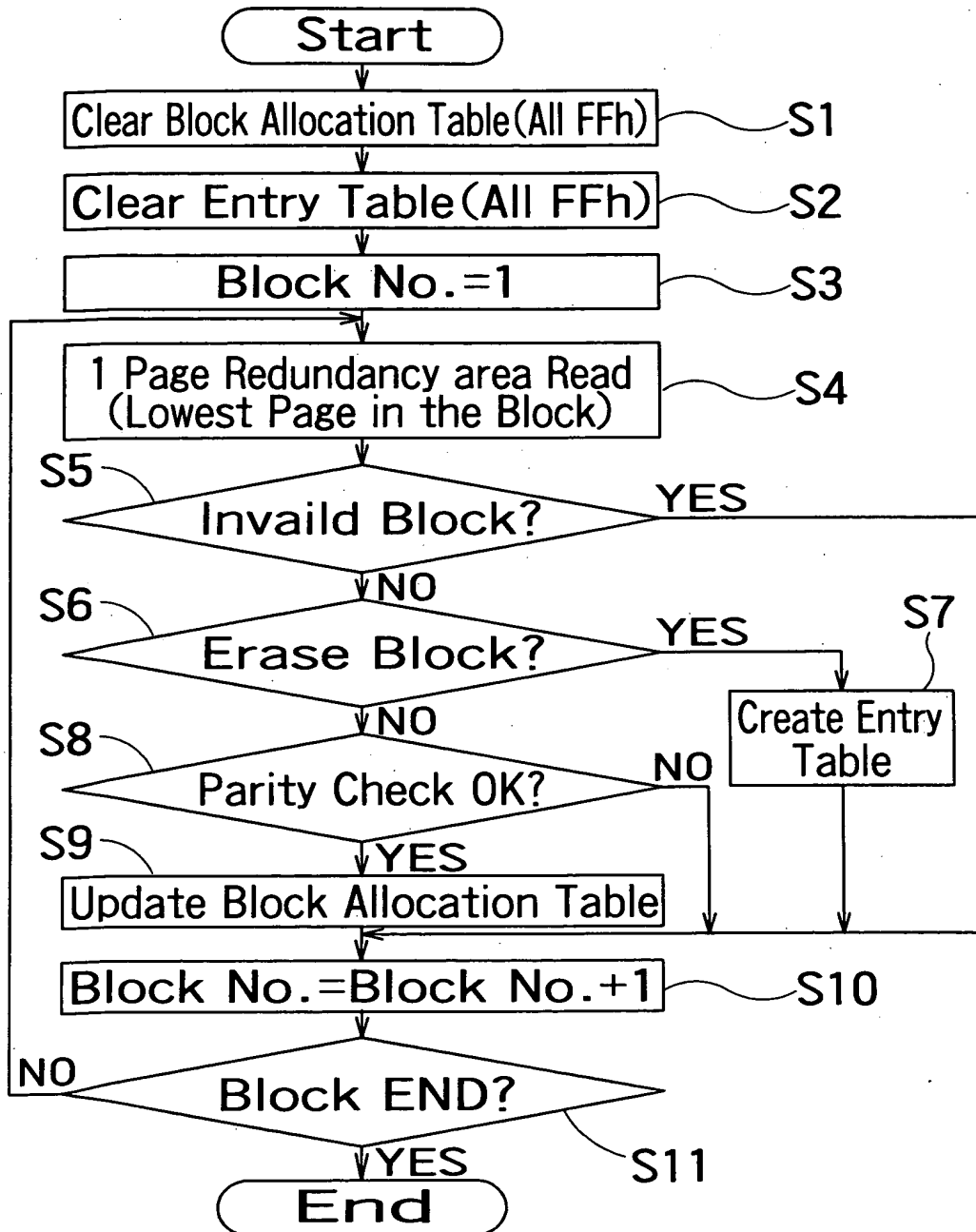


FIG. 33

27/45

OFFSET (LOGICAL BLOCK ADDRESS)	PHYSICAL BLOCK AREA ADDRESS	PHYSICAL BLOCK AREA ADDRESS (BINARY DATA)	
Word0(LBA=0)	0	0000	0000
Word1(LBA=1)	250	1111	1010
Word2(LBA=2)	163	1010	0011
⋮	⋮	⋮	⋮
Word497(LBA=497)	122	0111	1010
Word498(LBA=498)	248	1010	1000
Word499(LBA=499)	64	0100	0000

1 PHYSICAL BLOCK AREA=2 PHYSICAL BLOCK

FIG.34

28/45

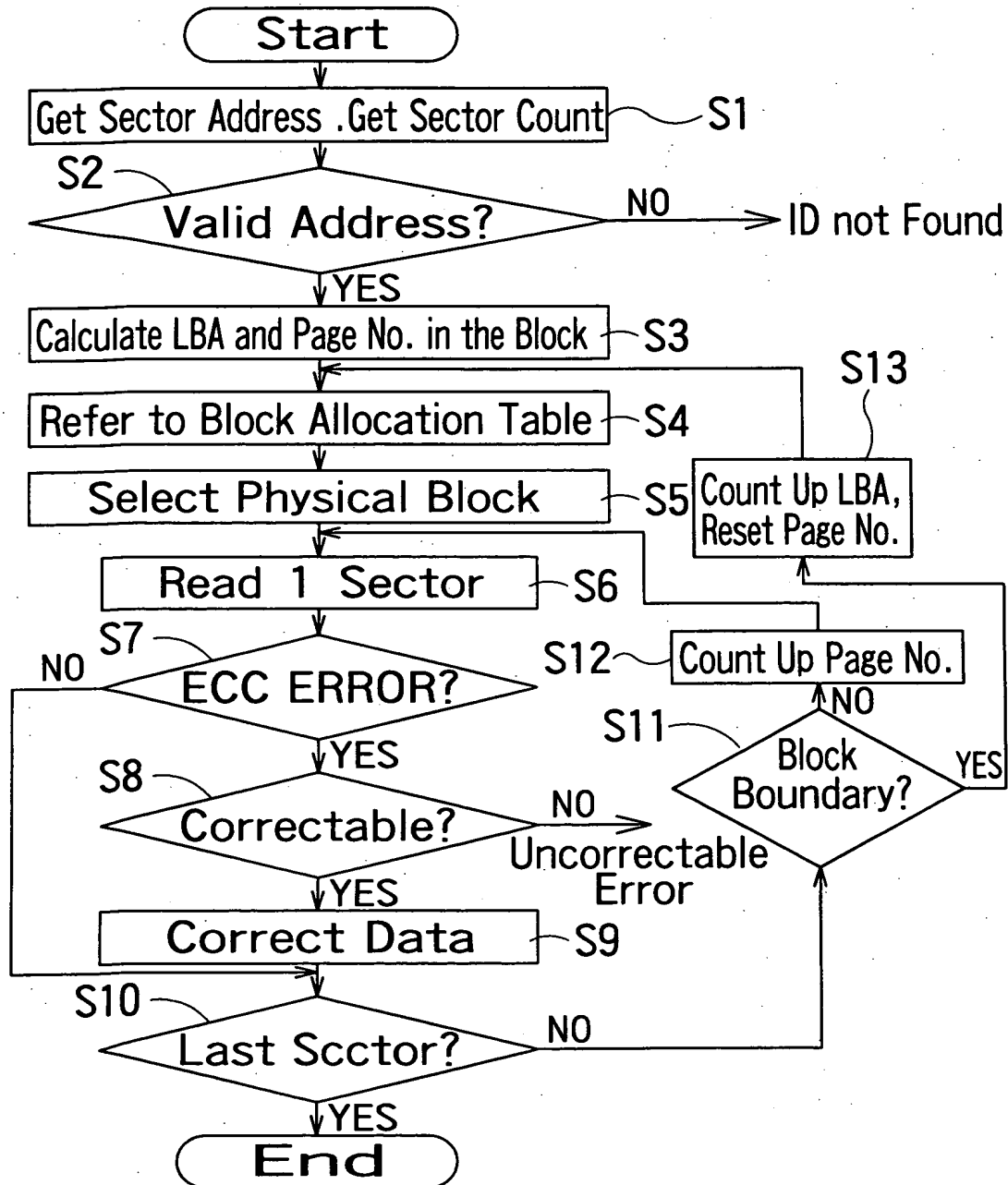


FIG. 35

29/45

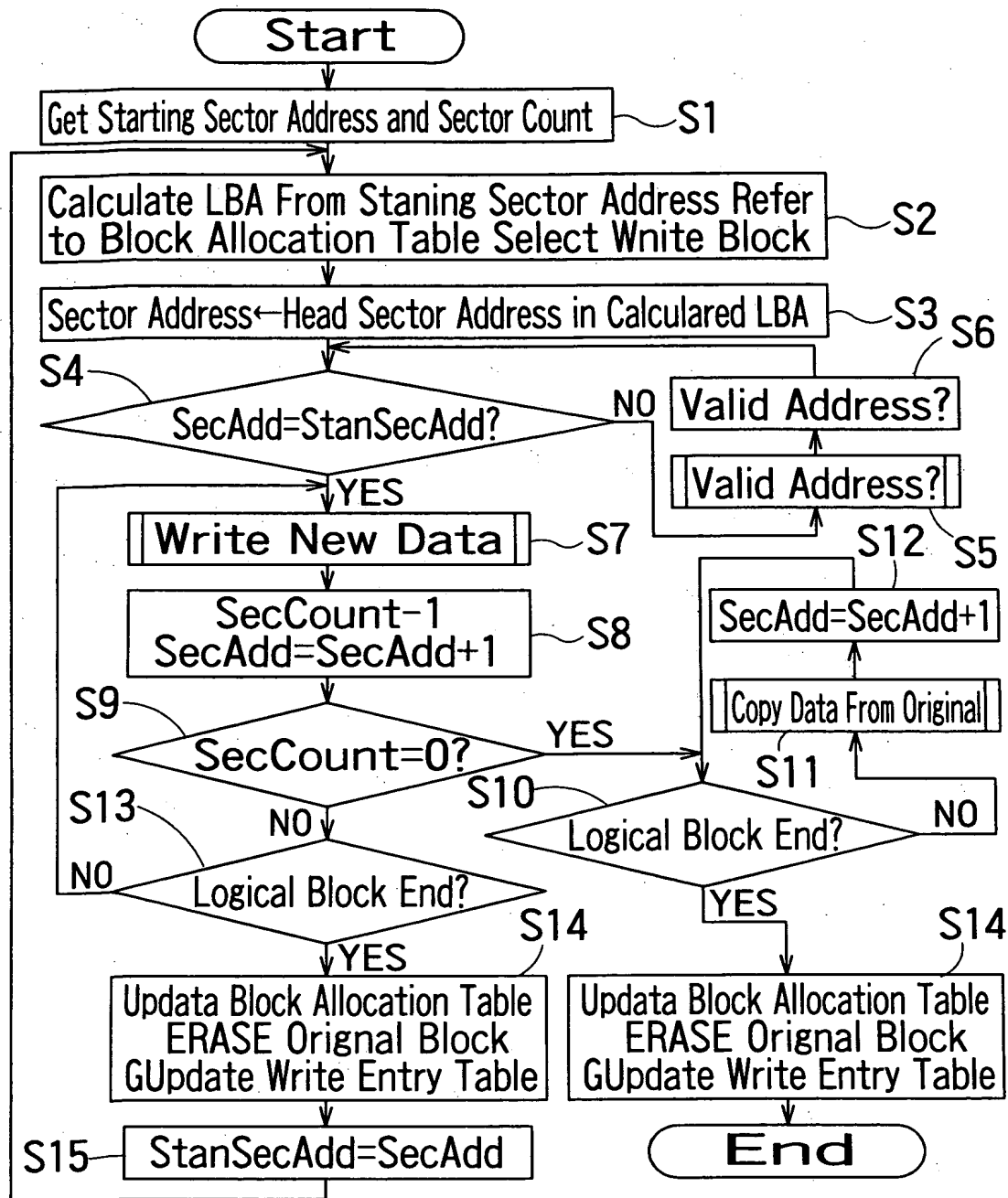


FIG. 36



31/45

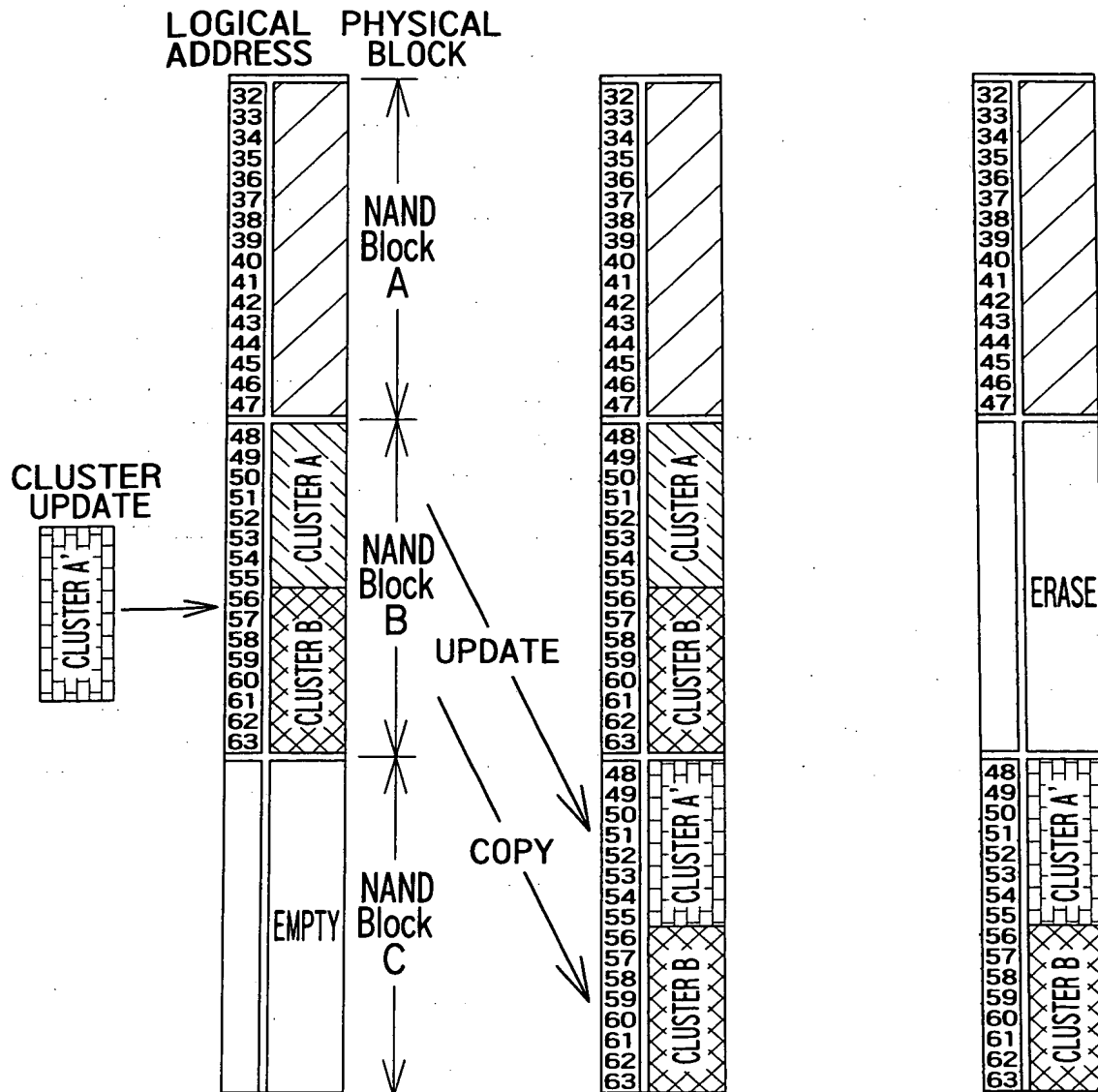


FIG. 38

32/45

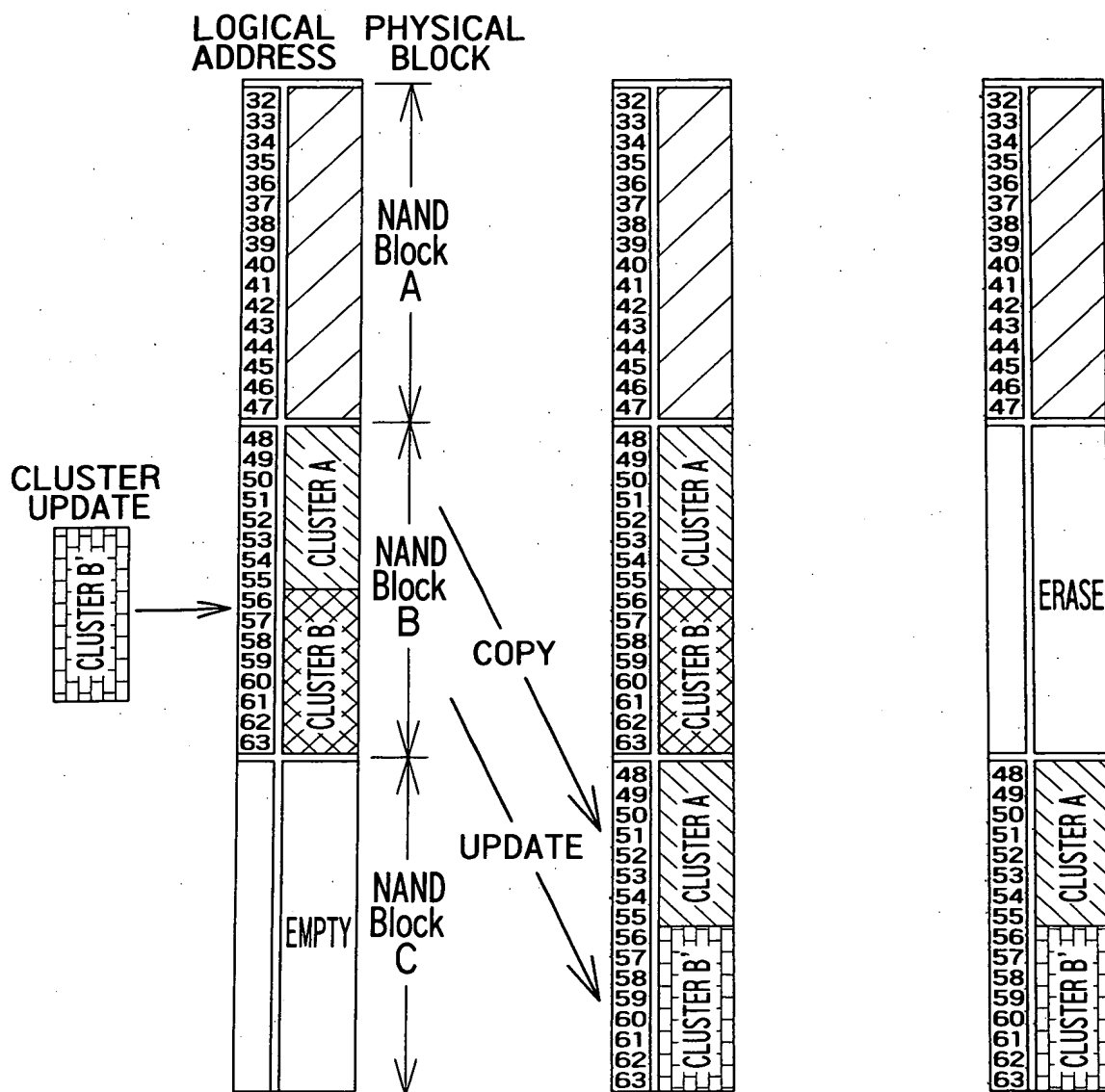


FIG. 39

33/45

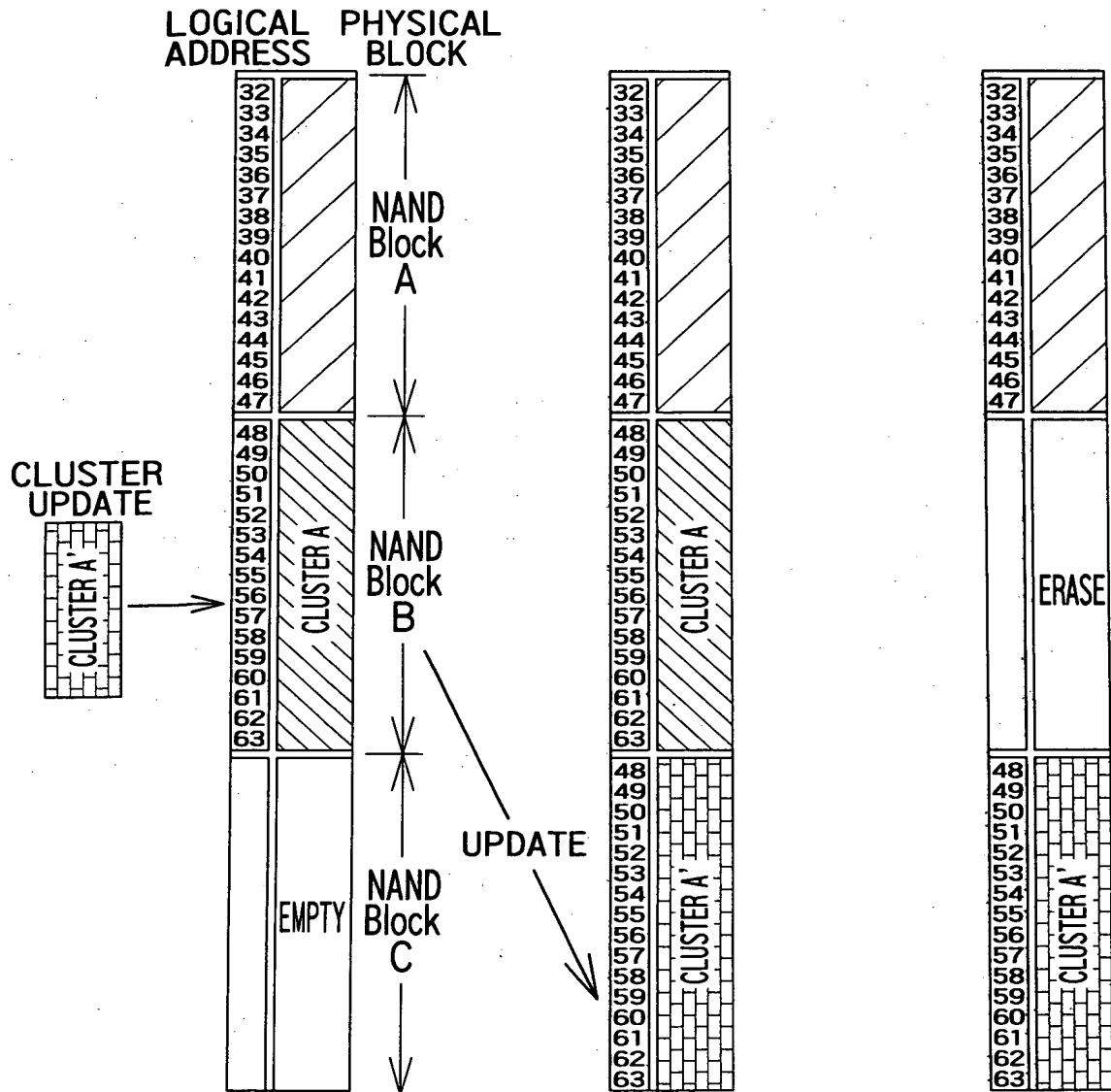


FIG. 40

34/45

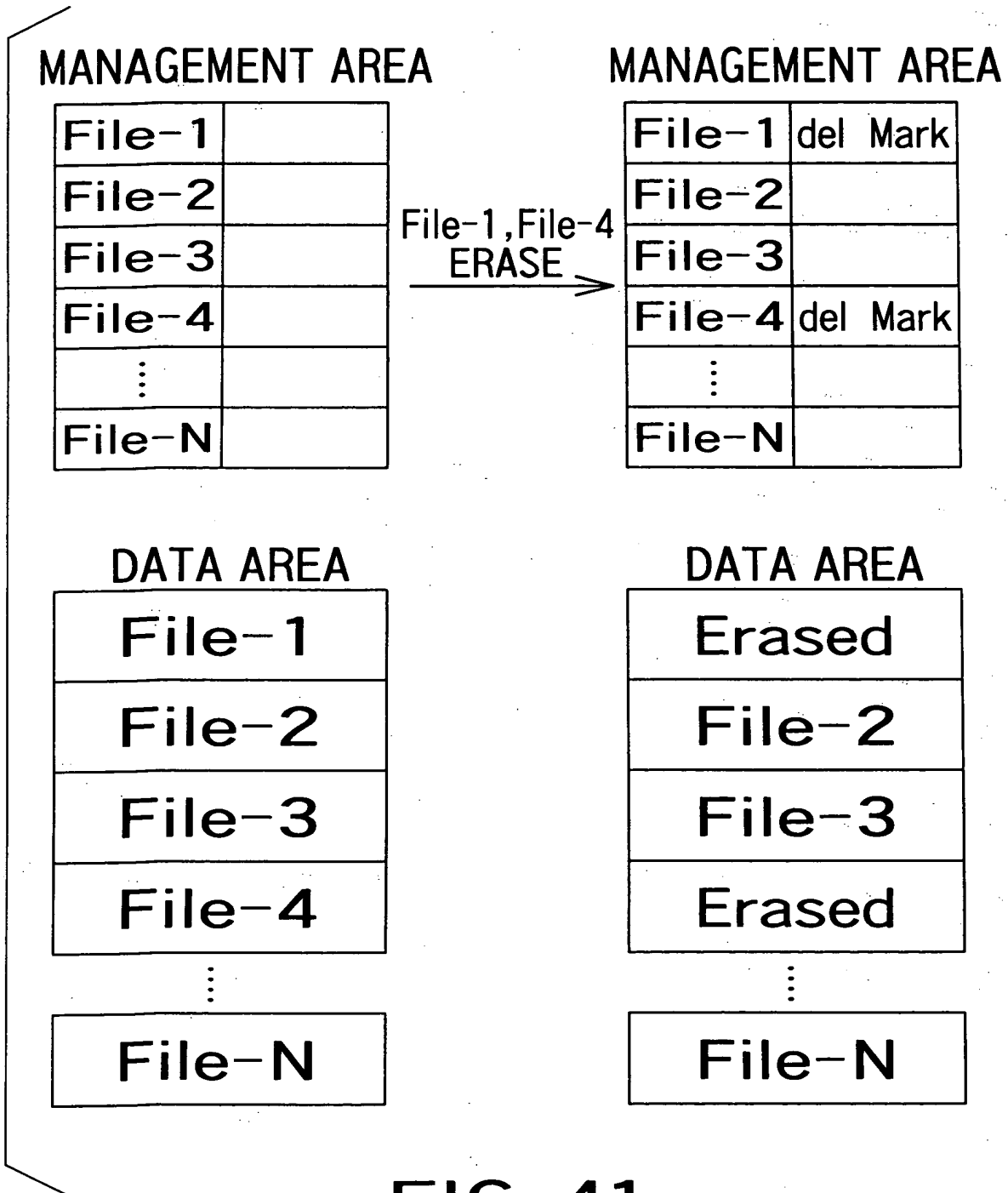


FIG. 41

35/45

OFFSET (LOGICAL BLOCK ADDRESS)	(PHYSICAL BLOCK ADDRESS)	
	Upper Byte	Lower Byte
Word0 (LBA=0)	Physical Block Upper Address	Physical Block Lower Address
Word1 (LBA=1)	Physical Block Upper Address	Physical Block Lower Address
Word2 (LBA=2)	Physical Block Upper Address	Physical Block Lower Address
⋮		
Word247 (LBA=247)	Physical Block Upper Address	Physical Block Lower Address
Word248 (LBA=248)	Physical Block Upper Address	Physical Block Lower Address
Word249 (LBA=249)	Physical Block Upper Address	Physical Block Lower Address

FIG. 42(a)

OFFSET (LOGICAL BLOCK ADDRESS)	(PHYSICAL BLOCK ADDRESS)	
	Upper Byte	Lower Byte
Word0 (LBA=250)	Physical Block Upper Address	Physical Block Lower Address
Word1 (LBA=251)	Physical Block Upper Address	Physical Block Lower Address
Word2 (LBA=252)	Physical Block Upper Address	Physical Block Lower Address
⋮		
Word247 (LBA=497)	Physical Block Upper Address	Physical Block Lower Address
Word248 (LBA=498)	Physical Block Upper Address	Physical Block Lower Address
Word249 (LBA=499)	Physical Block Upper Address	Physical Block Lower Address

FIG. 42(b)

36/45

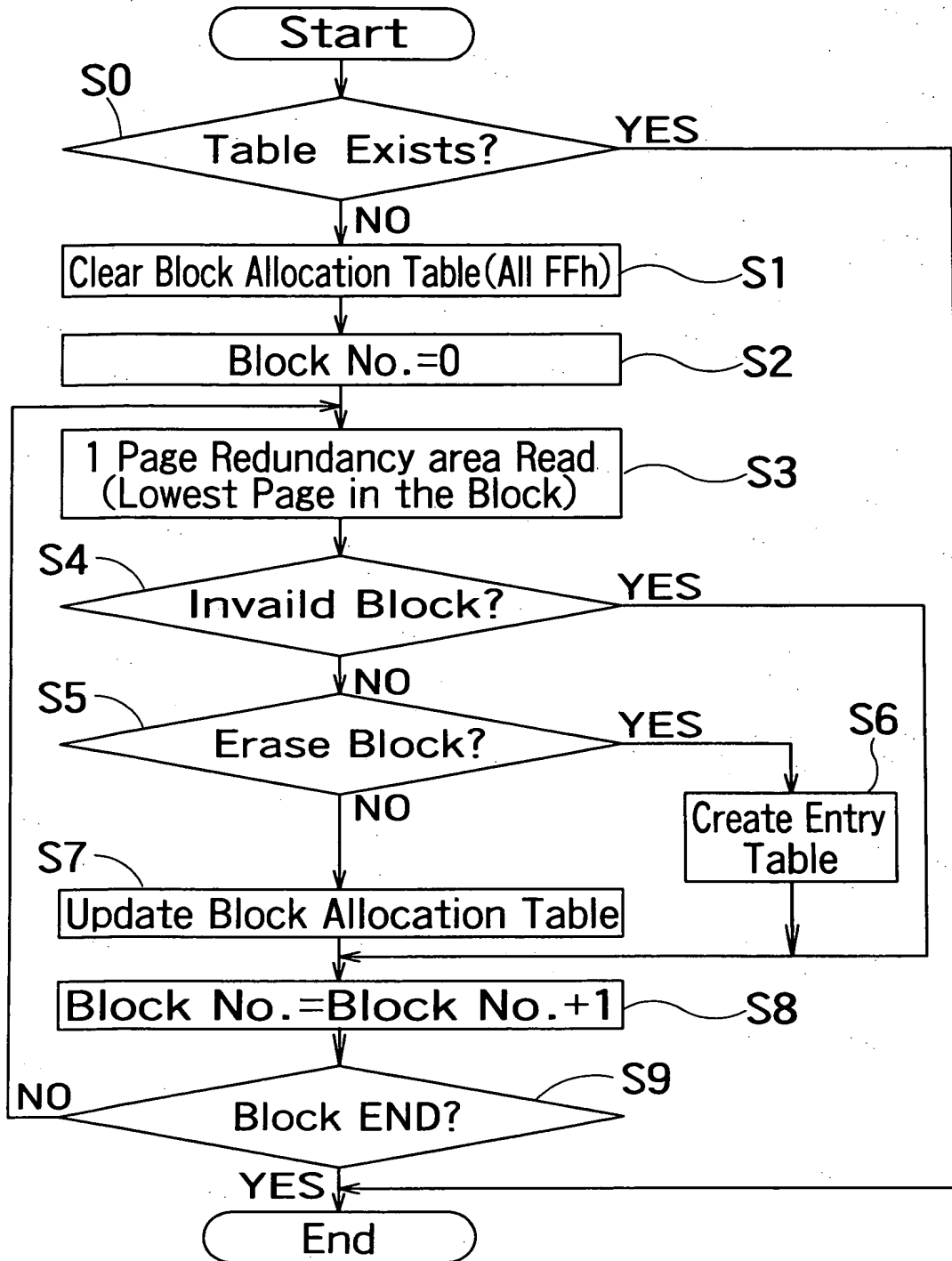


FIG. 43

37/45

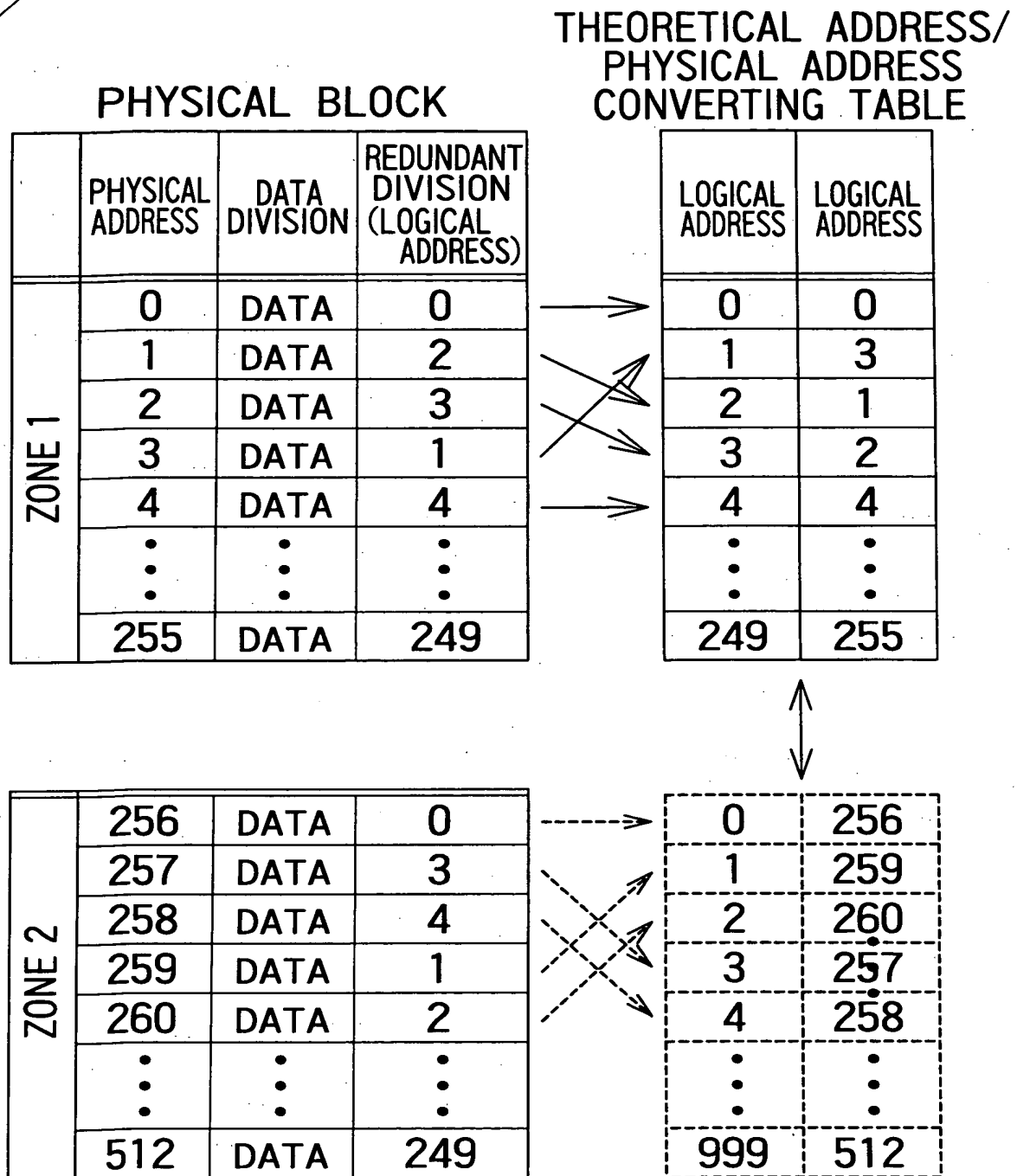


FIG. 44

38/45

		OFFSET (LOGICAL BLOCK ADDRESS)	PHYSICAL BLOCK ADDRESS	PHYSICAL BLOCK ADDRESS (BINARY DATA)		
ZONE 1	Word0 (LBA=0)	0	0000	0000	0000	
	Word2 (LBA=2)	227	0000	1110	0011	
	⋮	⋮	⋮	⋮	⋮	
	Word254 (LBA=254)	244	0000	1111	0100	
	Word255 (LBA=255)	128	0000	1000	0111	
ZONE 2	Word256 (LBA=256)	256(256-256=0)	0000	0000	0000	
	Word257 (LBA=257)	327(327-256=71)	0000	0100	0111	
	⋮	⋮	⋮	⋮	⋮	
	Word499 (LBA=499)	500(500-256=244)	0000	1110	0000	
	Word500 (LBA=500)	428(428-256=172)	0000	1010	1100	

FIG. 45

39/45

BEFORE REPLACEMENT OF BLOCK

PHYSICAL BLOCK ADDRESS		
NG	ZONE 1	0 Block0 data area
		1 Block1 data area
		2 Block2 data area
		3 Block3 data area
		4 Block4 data area
		5 Block5 data area
		6 Block6 data area
NG	ZONE 2	128 Block128 data area
		129 Block129 data area
		130 Block130 data area
		131 Block131 data area
		132 Block132 data area
		133 Block133 data area
		...
NG	ZONE 3	256 Block256 data area
		257 Block257 data area
		258 Block258 data area
		259 Block259 data area
		260 Block260 data area
		261 Block261 data area
		262 Block262 data area
NG	ZONE 4	384 Block384 data area
		385 Block385 data area
		386 Block386 data area
		387 Block387 data area
		388 Block388 data area
		389 Block389 data area
		...

REDUNDANT BLOCK

AFTER REPLACEMENT OF BLOCK

PHYSICAL BLOCK ADDRESS		
NG	ZONE 1	0 Block0 data area
		1 Block1 data area
		2 Block2 data area
		3 Block3 data area
		4 Block4 data area
		5 Block5 data area
		6 Block6 data area
NG	ZONE 2	128 Block128 data area
		129 Block129 data area
		130 Block130 data area
		131 Block131 data area
		132 Block132 data area
		133 Block133 data area
		...
NG	ZONE 3	256 Block256 data area
		257 Block257 data area
		258 Block258 data area
		259 Block259 data area
		260 Block260 data area
		261 Block261 data area
		262 Block262 data area
NG	ZONE 4	384 Block384 data area
		385 Block385 data area
		386 Block386 data area
		387 Block387 data area
		388 Block388 data area
		389 Block389 data area
		...

REDUNDANT BLOCK

2	Block2 data area
5	Block5 data area
129	Block129 data area
131	Block131 data area

FIG. 46

40/45

BEFORE REPLACEMENT OF BLOCK

PHYSICAL BLOCK ADDRESS

NG	0	Block0 data area
	1	Block1 data area
NG	2	Block2 data area
	3	Block3 data area
	4	Block4 data area
NG	5	Block5 data area
NG	6	Block6 data area
	7	Block7 data area
	8	Block8 data area
NG	9	Block9 data area
	10	Block10 data area
NG	11	Block11 data area
	12	Block12 data area
	13	Block13 data area
	14	Block14 data area
	⋮	⋮
NG	256	Block256 data area
	257	Block257 data area
	258	Block258 data area
NG	259	Block259 data area
	260	Block260 data area
NG	261	Block261 data area
	262	Block262 data area
	263	Block263 data area
NG	264	Block264 data area
NG	265	Block265 data area
	266	Block266 data area
	267	Block267 data area
	268	Block268 data area
NG	269	Block269 data area
	⋮	⋮

REDUNDANT BLOCK

AFTER REPLACEMENT OF BLOCK

PHYSICAL BLOCK ADDRESS

	0	Block0 data area	REDUNDANT BLOCK \wedge HARDWARE REDUNDANT
	1	Block1 data area	
	2	Block2 data area	REDUNDANT BLOCK \wedge HARDWARE REDUNDANT
	3	Block3 data area	
	4	Block4 data area	REDUNDANT BLOCK \wedge HARDWARE REDUNDANT
	5	Block5 data area	REDUNDANT BLOCK \wedge HARDWARE REDUNDANT
	6	Block6 data area	
	7	Block7 data area	
	8	Block8 data area	
	9	Block9 data area	
	10	Block10 data area	
	11	Block11 data area	REDUNDANT BLOCK \wedge HARDWARE REDUNDANT
	12	Block12 data area	
	13	Block13 data area	
	14	Block14 data area	
	⋮	⋮	
NG	256	Block256 data area	
	257	Block257 data area	
	258	Block258 data area	
NG	259	Block259 data area	
	260	Block260 data area	
NG	261	Block261 data area	
	262	Block262 data area	
	263	Block263 data area	
NG	264	Block264 data area	
NG	265	Block265 data area	
	266	Block266 data area	
	267	Block267 data area	
	268	Block268 data area	
NG	269	Block269 data area	
	⋮	⋮	

REDUNDANT BLOCK

0	Block0 data area
2	Block2 data area
4	Block4 data area
5	Block5 data area
9	Block9 data area
11	Block11 data area

FIG. 47

41/45

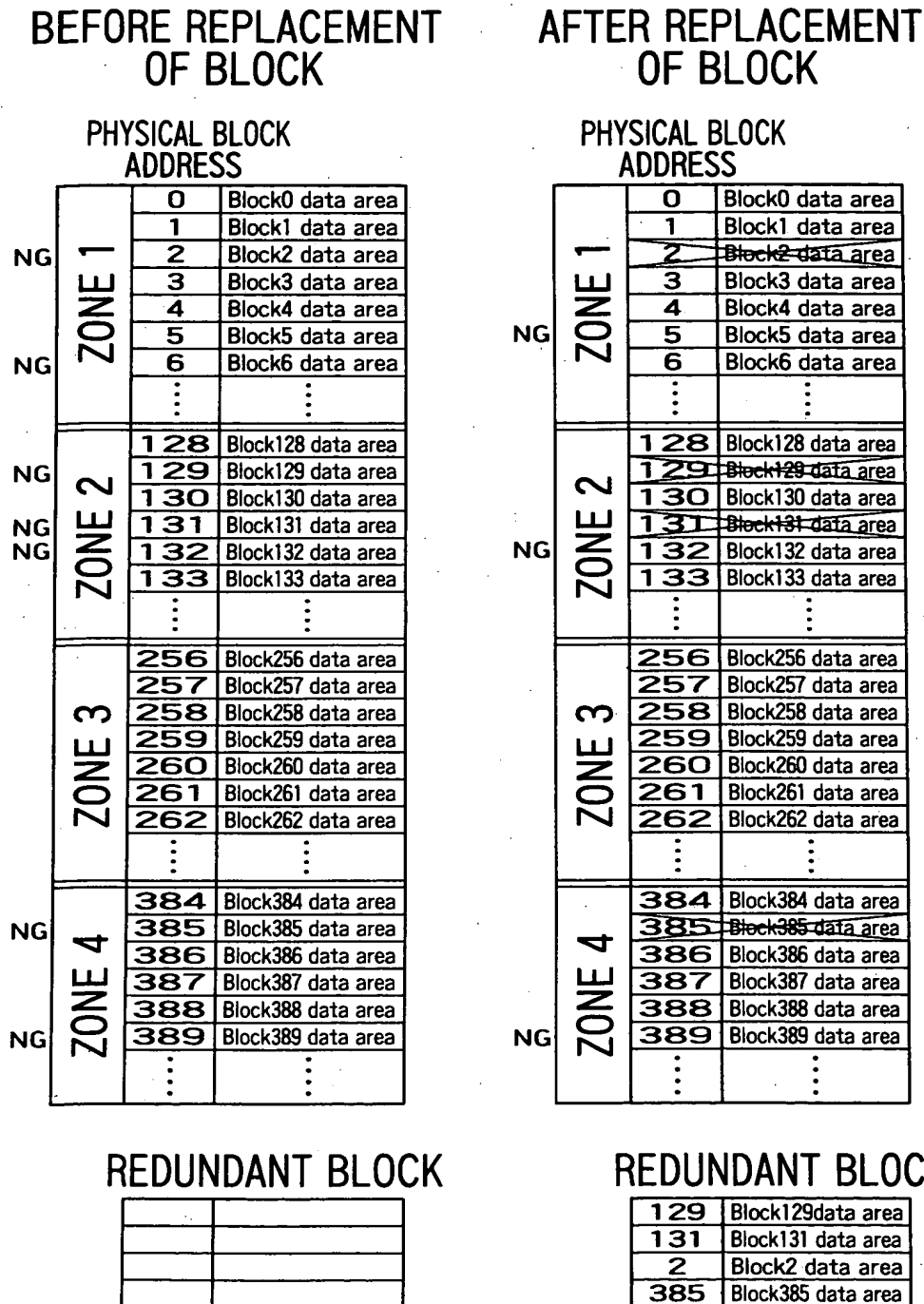


FIG. 48

42/45

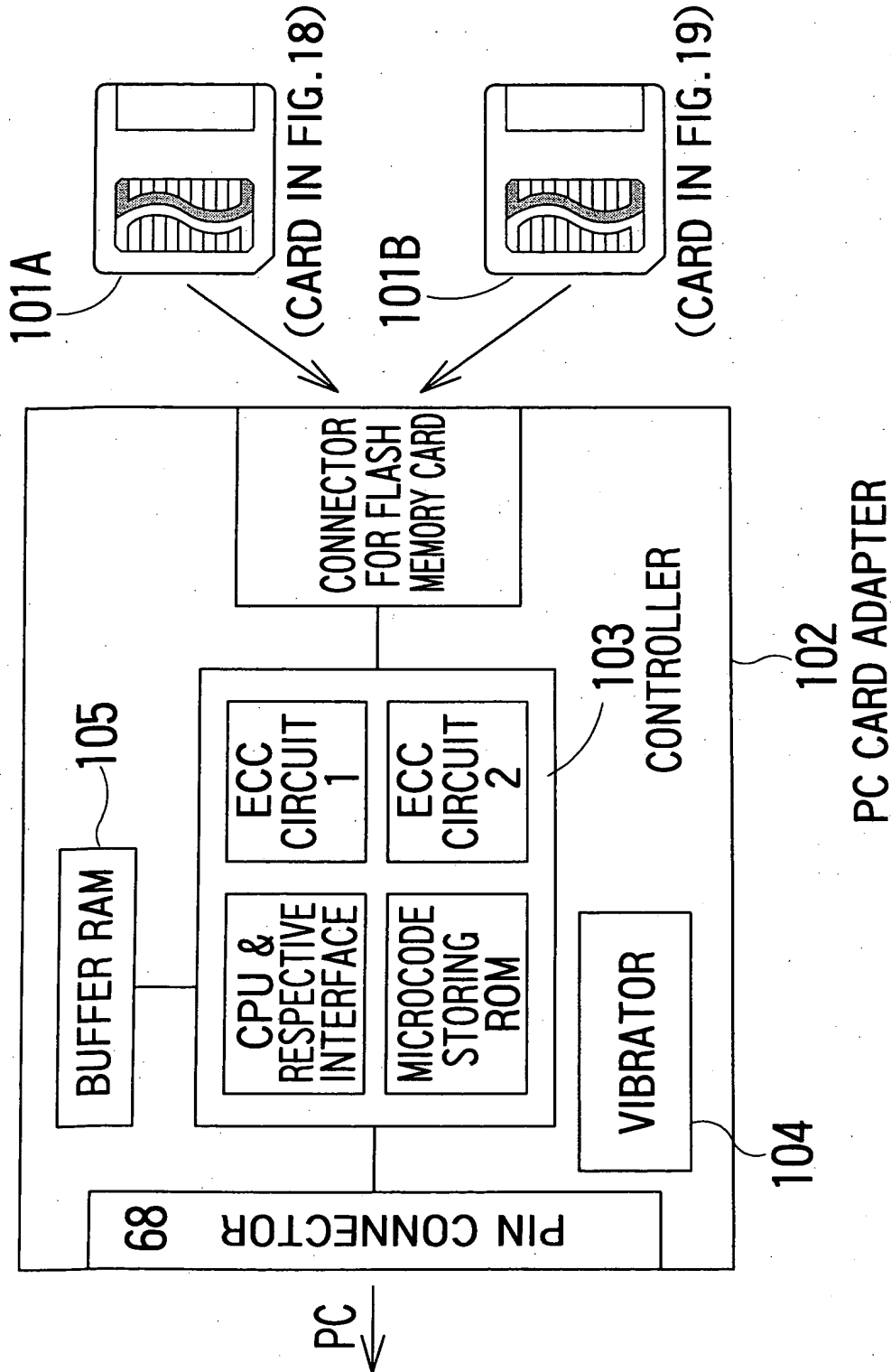


FIG. 49

43/45

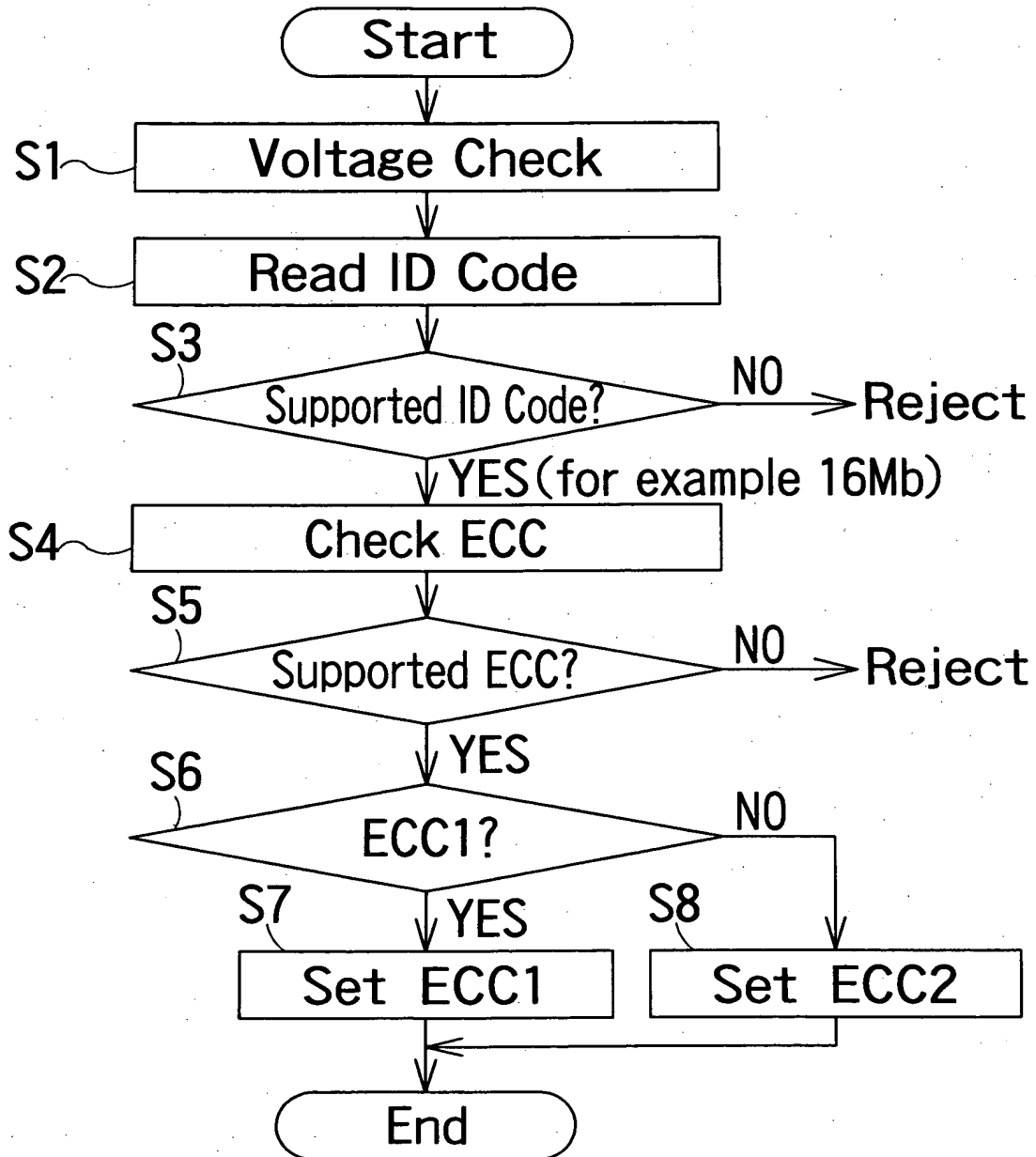


FIG. 50

44/45

DATA DIVISION

BYTE	PAGE 0(EVEN PAGE)	PAGE 1(ODD PAGE)
0~255	DATA Area-1	DATA Area-2

REDUNDANT DIVISION

BYTE	EVEN PAGE	ODD PAGE
256	ECC Flag Area	ECC Area-2
257	ECC Area-3	
258		
259		
260	Data Status Area	Block Address Area-2
261	Block Status Area	ECC Area-1
262	Block Address Area-1	
263		

FIG.51

45/45

	ECC-AREA1	ECC-AREA2	ECC-AREA3	ECC-AREA4
ECC METHOD 1	ECC CODE FOR DATA AREA-1	ECC CODE FOR DATA AREA-2	NULL (ALL "FFh")	ECC1-FLAG
ECC METHOD 2	ECC CODE FOR DATA AREA-1,2	ECC CODE FOR DATA AREA-1,2	ECC CODE FOR DATA AREA-1,2	ECC2-FLAG

FIG. 52